

ICN LoWPAN

draft-gundogan-icnrg-ccnlowpan-02

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March 20, 2018

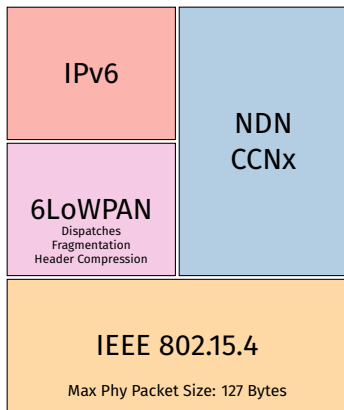
Agenda

ICN LoWPAN Recap

Draft Updates

Implementation & Next Steps

ICN LoWPAN Recap

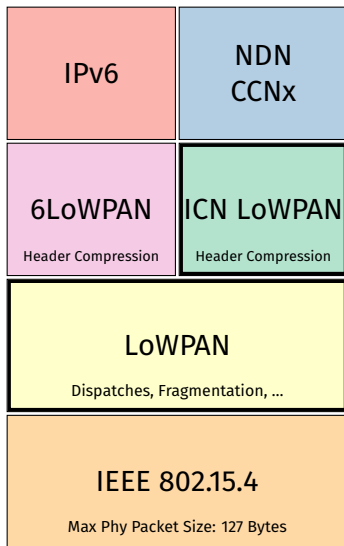


Problems:

1. No Protocol Identifier

2. Small Phy. Packet Size

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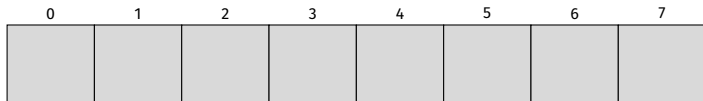
Draft Updates

Update since -01

- ▶ NDN packet format version bump (v0.3)
- ▶ Restructure ICN LoWPAN dispatch bytes
- ▶ Name encoding enhancements
- ▶ Added theoretical evaluation

NDN Interest Encoding (v0.3)

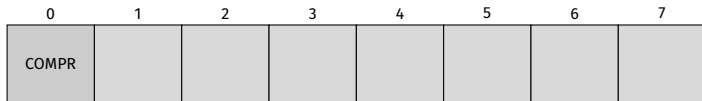
	Interest	Length	
	Name	Length	...
Optional	CanBePref	Length=0	
	MustBeFresh	Length=0	
	FwdHint	Length	...
	Nonce	Length=4	...
	Lifetime	Length	...
	HopLimit	Length=1	...
	Parameters	Length	...



Dispatch octet

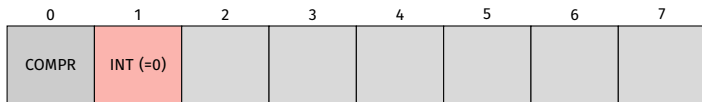
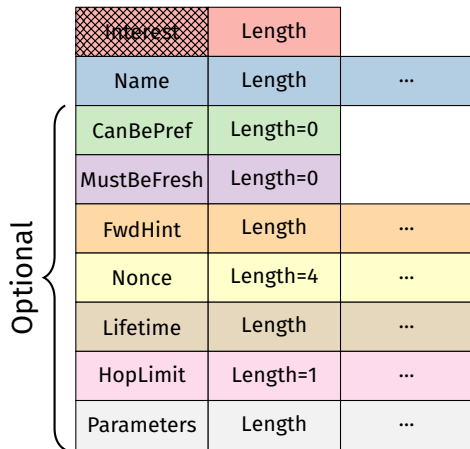
NDN Interest Encoding (v0.3)

Optional	Interest	Length	
	Name	Length	...
	CanBePref	Length=0	
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	FwdHint	Length	...
	Nonce	Length=4	...
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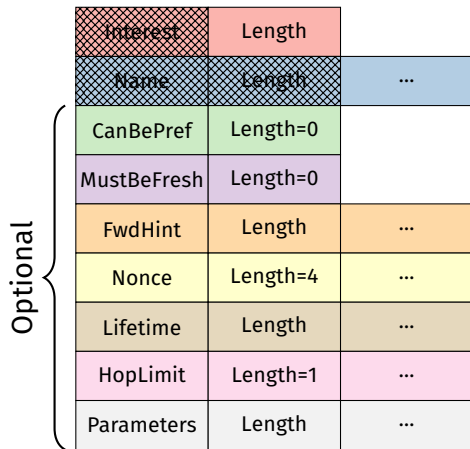
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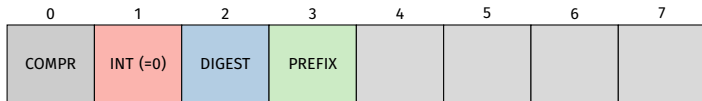
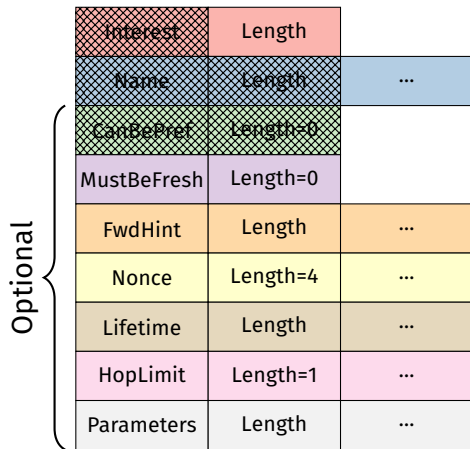
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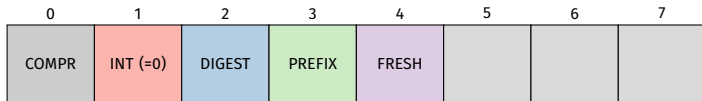
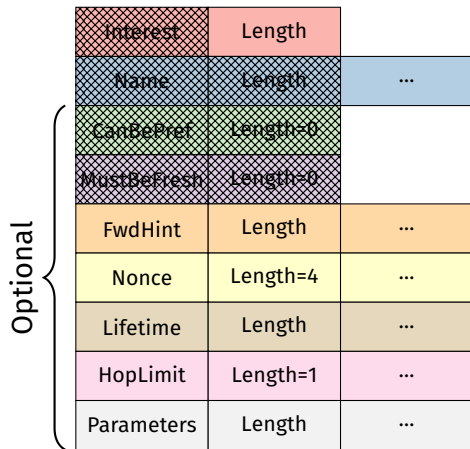
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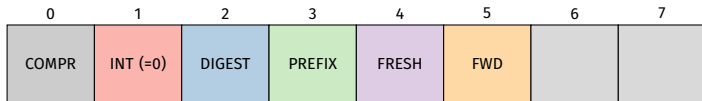
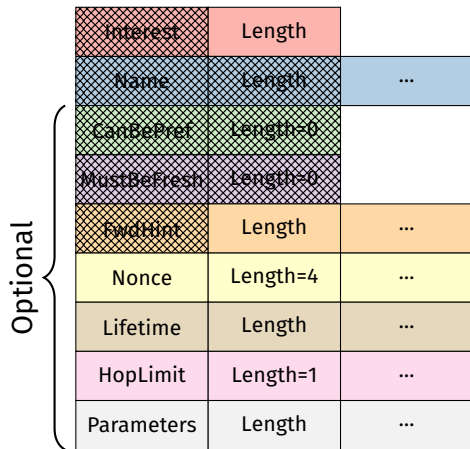
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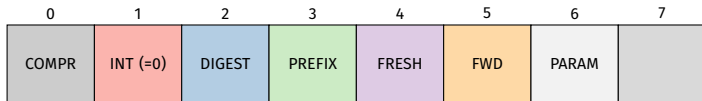
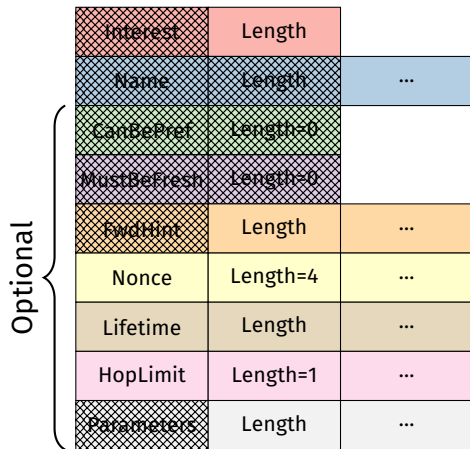
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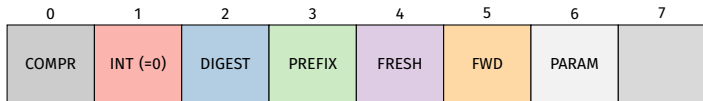
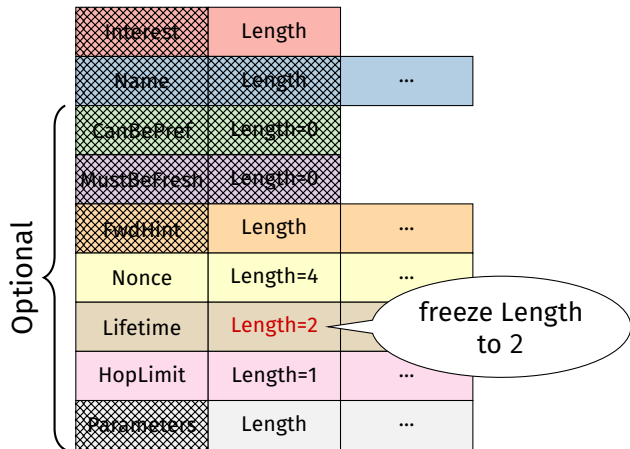
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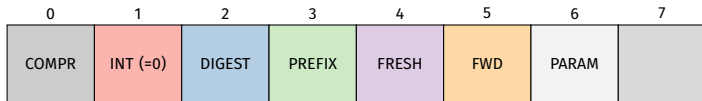
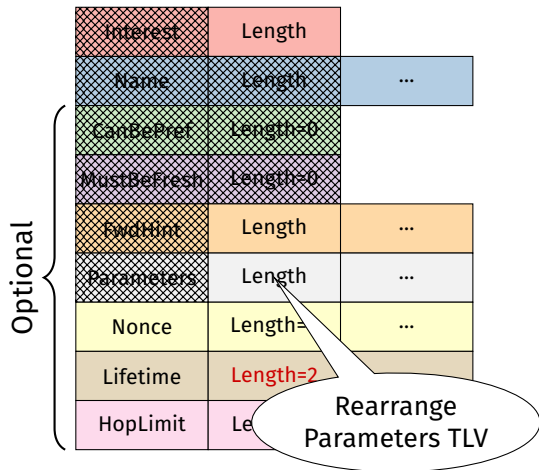
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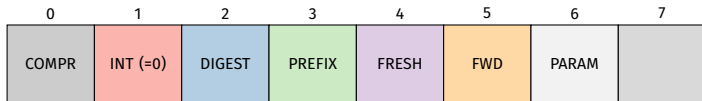
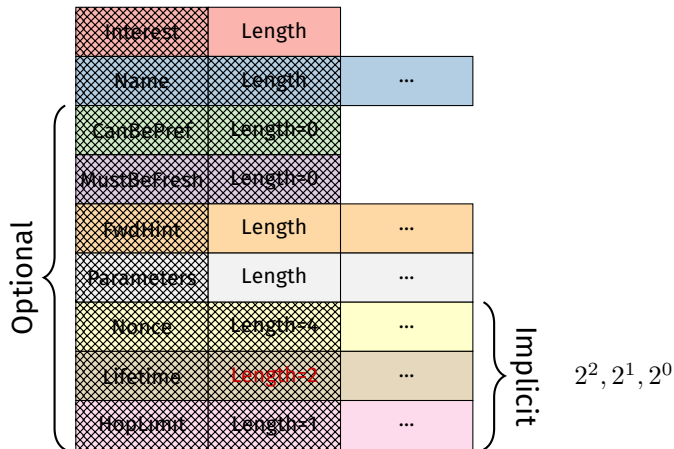
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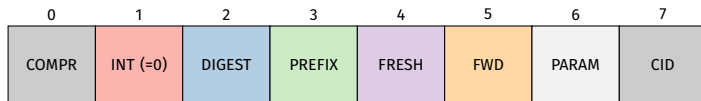
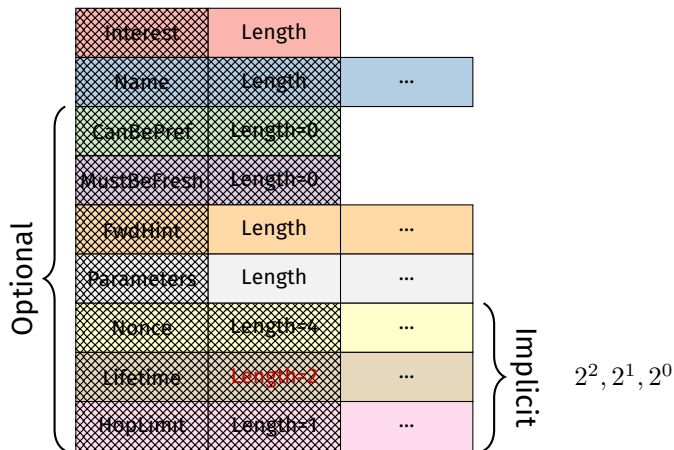
Dispatch octet

NDN Interest Encoding (v0.3)



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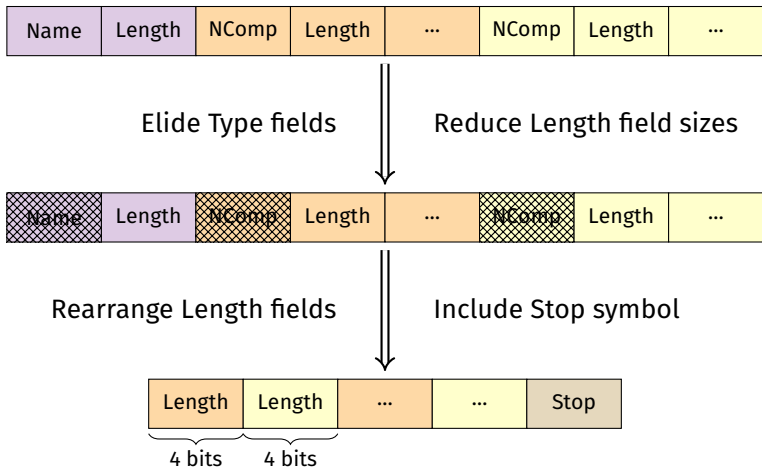


Dispatch octet

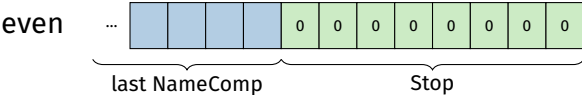
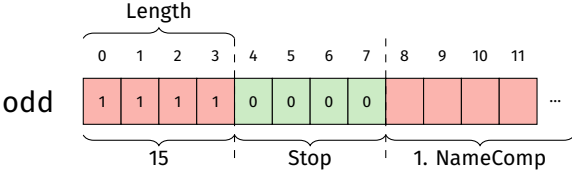
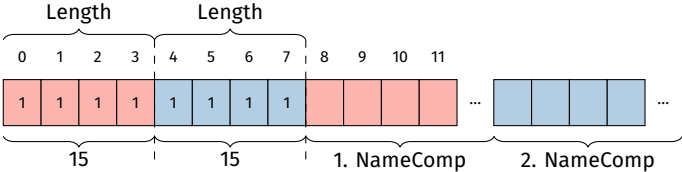
Name Encoding (I)

Premise: Uniform NameComponent Types

Premise: Short NameComponents (≤ 15 octets each)



Name Encoding (II)



$|c|$ = number of components

Length octets =

$$\left\lceil \frac{|c|+1}{2} \right\rceil$$

\wedge

$$2 + 2 \cdot |c|$$

Name Encoding (III)

/IETF/101/Sensor/Temp/2018

(odd)

TL	TL	IETF	TL	101	TL	Sensor	TL	Temp	TL	2018
----	----	------	----	-----	----	--------	----	------	----	------

L	IETF	101	L	Sensor	Temp	L	2018
---	------	-----	---	--------	------	---	------

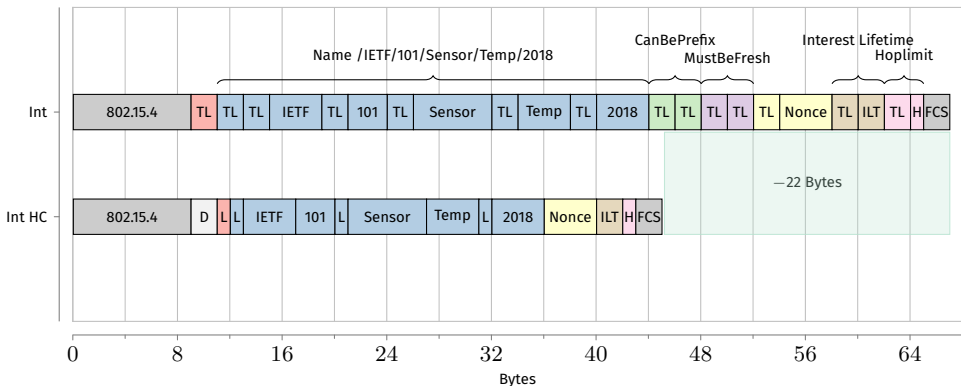
/IETF/101/Sensor/Temp/2018/01

(even)

TL	TL	IETF	TL	101	TL	Sensor	TL	Temp	TL	2018	TL	01
----	----	------	----	-----	----	--------	----	------	----	------	----	----

L	IETF	101	L	Sensor	Temp	L	2018	01	S
---	------	-----	---	--------	------	---	------	----	---

Example: NDN Interest Encoding



IEEE 802.15.4 Header & FCS: 11 Bytes

	Uncompressed	Compressed	
Payload:	56 Bytes	34 Bytes	<u>≈ 40 % Compression</u>
Meta-Info (T+L):	28 Bytes	6 Bytes	<u>≈ 78 % Compression</u>

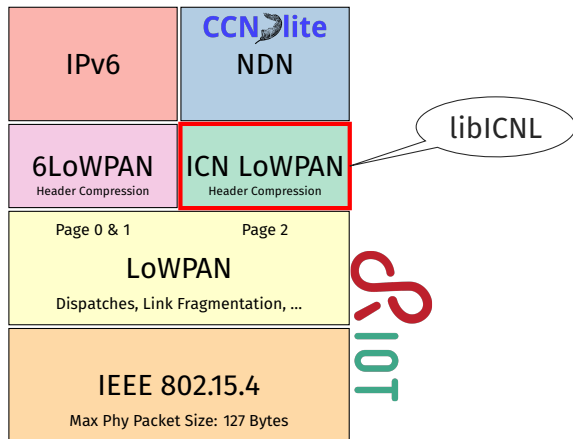
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Implementation



libICNL – <https://github.com/inetrg/libICNL.git>

 – <https://riot-os.org>

CCNlite – <http://ccn-lite.net>

Next Steps

BLE & LoRa Adaptation

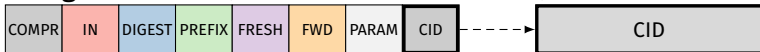
- ▶ Adapt to work of RFC 7668 – IPv6 over BLE and LPWAN WG

Stateless Compression

- ▶ Use LZ77 style compression for nested / custom TLVs

Stateful Compression

- ▶ Use global state (with context identifiers)



- ▶ Use on-path state (PIT)

Investigate Related Work

- ▶ Marc Mosko – Header Compression for TLV-based Packets
ICNRG Buenos Aires (IETF 95), 2016